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Assessment Highlights

Grade 6 Science



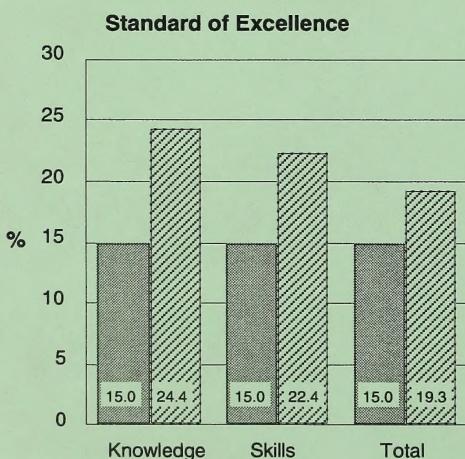
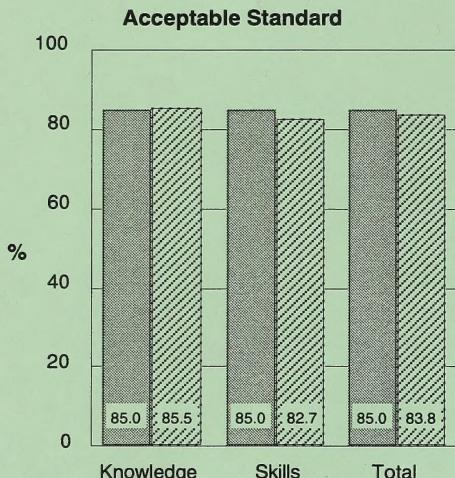
June 1995

Assessment Highlights

Grade 6 Science

This report provides teachers, school administrators, and the public with an overview of the results for the June 1995 Grade 6 Science provincial assessment. It complements the detailed school and jurisdiction reports.

Percentage of Students Meeting:



Achievement Standards*
 Actual Results**

*the percentage of students in the province expected to meet the acceptable standard and the standard of excellence

**the percentage of students in the province who met the standards (based on those who wrote)

Who Wrote the Test?

All students registered in Grade 6 were expected to write the 1995 Science assessment. A total of 40 268 students completed the June 1995 assessment. This number reflects an increase of more than 1 300 students over last year. In 1995, only a small proportion of students in Grade 6 did not write the test: 2.1% of students were absent and 1.9% of students were excused from writing by their superintendent.

What Was the Test Like?

The assessment instrument had 60 multiple-choice questions in three topic areas: Matter and Energy, Living Things and Environment, and Earth, Space, and Time. Two learning domains were assessed: Knowledge (23 questions) and Skills (37 questions). Students recorded their responses to questions on a separate answer sheet.

How Well Did Students Do?

As shown by the graphs, the number of students meeting the acceptable standard on the total test is slightly below provincial expectations. The number of students achieving the standard of excellence on the total test was higher than expected.

In 11.8% of the schools, the percentage of students meeting the acceptable standard was significantly above expectations for the province. In 68.2% of the schools, the percentage was not significantly different from provincial expectations. In 19.9% of schools the percentage of students meeting the acceptable standard was significantly below provincial expectations. Schools where fewer than five students wrote the Grade 6 test are not included in the calculations.

The results presented in this report are based on scores achieved by all students who wrote except those in the Francophone Program. Results for Francophone students are reported separately.

Has Achievement Changed Over Time?

A comparison of scores on items common to the 1994 and 1995 Grade 6 Science achievement tests indicates no change in achievement since 1994. In 1994, a special study of changes in achievement was conducted as part of the provincial assessment. Results indicated that science achievement in 1994 was higher than in 1990, 1986, and 1982.

Test Blueprint

Each question on the blueprint is classified according to topic and learning domain. The blueprint shows the distribution of questions according to these classifications.

Topic	Questions		Number of Questions	
	Learning Domain			
	Concepts	Skills		
1. Matter and Energy	12, 20, 32, 35, 38, 45, 46, 54, 55	6, 8, 9, 21, 22, 26, 33, 37, 44, 47, 48, 49, 50, 51, 52, 56, 60	26	
2. Living Things and Environment	1, 4, 5, 15, 16, 18, 19, 36, 40, 57	2, 3, 7, 10, 13, 24, 39, 43, 53, 58	20	
3. Earth, Space, and Time	11, 14, 25, 28	17, 23, 27, 29, 30, 34, 41, 42, 59	13	
Number of Questions	23	36	59	

Test Review

The Grade 6 teachers who reviewed and set standards for the assessment felt that it adequately covered both concepts and process skills in all three units and that it was a good reflection of the science program. The majority of teachers appreciated "real-life situations" presented in the context of the questions and felt the greater emphasis on skills rather than concepts was appropriate. They also felt that the assessment had a good range of question types and difficulties that were representative of the science program. The group encouraged continued improvement of the graphics and pictures and felt the test could be shortened in both the number of questions and the amount of reading. A high percentage of the group indicated that the achievement test scores agreed closely with students' year-long work.

Observations and Sample Questions

The following questions are no longer secured as are those included in the subject area bulletins. Sample questions from the assessment and accompanying discussion are provided to highlight the strengths and weaknesses demonstrated by students meeting the acceptable standard and the standard of excellence. For each sample question, there is an asterisk beside the correct answer.

Use the following information to answer question 14.

The children and their grandfather camped near Drumheller, a very dry area in south-central Alberta. Grandfather took Rita and Mike to see the hoodoos, which are unusual rock formations.



14. Hoodoos are formed **mainly** by

- *A. wind
- B. sun
- C. snow
- D. cold

40. While at the zoo, they read the following facts about a particular insect: "The insect prefers high temperatures, moist conditions, and dim light." Marcus knew this insect would prefer

- A. an ocean beach
- *B. a tropical jungle
- C. a northern forest
- D. a prairie grassland

Acceptable Standard

Overall, results show that students who met the *acceptable standard* were able to

- recognize patterns to make inferences
- make inferences from data presented
- solve routine problems
- make observations from a graph
- identify organisms in a food chain
- use a dichotomous key
- identify adaptations
- recognize simple open and closed circuits
- understand the concept of reflection
- identify renewable and non-renewable energy sources
- understand the scientific process for experimentation
- understand life cycles
- identify physical characteristics of matter

Question 14 required students to recognize wind erosion alters land forms. About 80% of the students achieving the acceptable standard were successful with this.

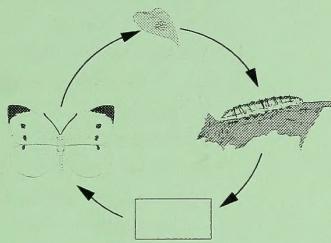
For **question 40**, students had to identify the habitat of an insect from information provided. Only 77% of the students at this level were successful.

Question 36 required students to identify different stages of an insect life cycle. About 91% of these students were successful with the task.

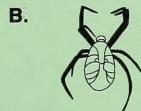
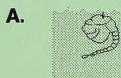
For **question 50**, students had to apply the experimental design needed to test the melting temperature of different shapes of a metal. Approximately 74% of the students at this level were successful.

Use the following information to answer question 36.

Jane was working on an article about insect pests in the city. She knows that butterflies have four stages in their growth. In her garden, she saw three of the stages of a cabbage butterfly and made this diagram for the article.

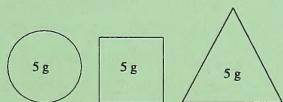


36. To complete her diagram of the life cycle, Jane needs to draw a living thing that looks like

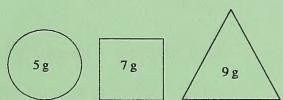


50. Sonja needed to melt some aluminum. She decided to test whether shape affects the time it takes to melt a 5 g piece of aluminum. Which picture shows the pieces of aluminum she most likely used to do this test?

*A.



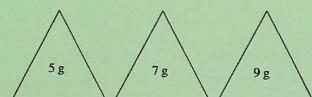
B.



C.



D.



Many of these students, however, did not do as well in

- making specific observations
- determining controlled variables
- making interpretations from a graph
- interpreting data from a chart and selecting a graph to represent that data
- relating humidity to everyday life situations
- predicting the path of a light beam as it is refracted
- making inferences about chemical changes
- recognizing earth changes that take place over a long period of time

Standard of Excellence

The following commentary highlights the skills and knowledge of students who met the *standard of excellence*.

For **question 8**, students had to predict the path of a light beam as it passes from water into air. Approximately 65% of the students at this level were successful with this task.

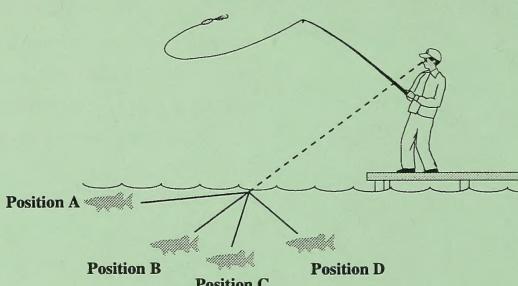
Question 28 required that students recognize the stages of the water cycle. About 89% of the students at this level were successful.

For **question 44**, students had to infer the correct sequence of contacts to complete a circuit. About 87% students at this level were successful.

Question 53 required students to hypothesize possible reasons to account for a particular experimental design. More than 89% of the students at this level were successful with the task.

Use the following information to answer question 8.

When Mike went fishing that afternoon, he saw a fish near the pier.



8. He knew that the actual position of that fish was

- A. position A
- B. position B
- *C. position C**
- D. position D

Use the following information to answer question 28.

Early one morning, Rita filled her cup with water from a cold mountain stream. After 10 minutes, she observed water drops on the outside of the cup.



28. She commented to Mike that this demonstrates

- A. the water cycle
- *B. water condensation**
- C. the heating of water
- D. water evaporation

Students who met the *standard of excellence* demonstrated more success than did other students when answering questions that required applying science concepts in novel or new contexts, identifying variables, and interpreting data. Specifically, students meeting this standard could

- transfer and apply knowledge
- look at problems from a number of viewpoints
- analyze patterns
- interpret, analyze, and accurately apply information from charts and graphs
- make accurate inferences from data
- apply information to new situations
- distinguish between behavioral, functional, and structural adaptations
- extrapolate from data presented in chart or graph form

Comments

Dropped Questions

Question 31 was removed from both the English and French forms of the test as the teacher validation committee felt that the question was confusing to both students and teachers alike. Question 38 was removed from the French version as the diagram was not correct.

Local Marking

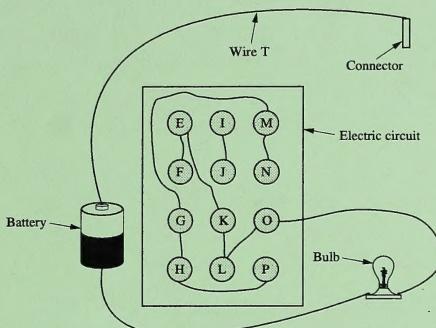
June 1995 was the first year that teachers had the opportunity to mark their students' tests locally and use these results as one part of the students' final grade calculation. Teachers have responded positively to this change in policy.

Resolving Administration Anomalies

Although we announced the new practice of reusing items from 1992, 1993, or 1994 tests, and the securing of these tests as late as October 1994, most schools were able to respond quickly and were successful in avoiding the use of these tests with students. Consequently, the 1995 testing was conducted effectively throughout Alberta without compromising

Use the following information to answer question 44.

Omrid, one of the workers, was testing an electric circuit on a display board.

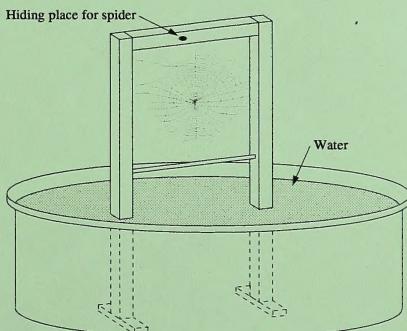


44. In order to light the bulb, Omrid placed the connector on point

- A. J
- *B. K
- C. P
- D. N

Use the following information to answer question 23.

Nadia, a Grade 6 student, wanted to know if spiders would help to reduce the number of flying insects in a room. She did a study on how many insects a spider caught in a week.



53. Why did Nadia place the frame in a pan of water?

- A. To capture insects
- B. To provide drinking water for the spider
- C. To keep the stand upright
- *D. To prevent the spider from escaping

the validity of the results. In a few schools, however, questions were raised about students' prior access to the test items and concerns were rightfully expressed about fairness and accuracy. Superintendents were asked to investigate, along with school principals and teachers, these and all other non-standard testing practices brought to our attention and to make recommendations about the validity of results. Initially, the Grade 6 Science results for 189 students were withheld pending further investigation due to validity concerns. In response to these investigations the results for only 1 student was judged to be invalid.

Release of Secured Items

As outlined in the General Information Bulletin, items from the achievement tests are secured except those that are released each year in the subject area bulletins. The items in these bulletins may be used to prepare students for the provincial assessment. The subject area bulletins are mailed to all schools in the fall.

Two Science Test Versions in 1996

Two versions of the Grade 6 Science Achievement Test will be available for June 1996. One version reflects the current learning expectations whereas the second version reflects the new learning expectations which are being implemented on an optional basis during the 1995-96 school year.

Continued Focus on Broad Learnings

The provincial assessments for Science 6 have been based on learning expectations from the Division II Science curriculum. It is expected that future provincial assessments for Science 6 will continue to measure the major learnings that students are expected to have after six years of science education.



Parent Guide to Provincial Achievement Testing

Last spring, we sent to schools copies of the *Parent Guide to Provincial Achievement Testing* to distribute to parents through the students in grades 3, 6, and 9. The purpose was to support open communication about provincial standards and the testing program among the teacher, the student, and the parent. The guide included a tear-out card with several questions and space for comments. Parents returned over 2000 cards; about half included comments. Parents' feedback about the learnings expected of students, the quality of questions on the tests, and the testing program was generally positive. Their written comments ranged from positive to negative, and many simply asked for more information. As parents seemed to appreciate this form of communication, we are looking for a way to make the guide available again later this school year.

Performance-Based Assessment

In addition to writing the achievement test, a random sample of students from across the province participated in performance-based assessments in **Language Arts 3**, **Mathematics 6**, and **Social Studies 9**.

Performance-based assessment reports will be sent to participating schools. A "Samples of Student Responses" document for the performance-based assessment will be prepared and made available to all schools in the spring of 1996.

1995 Administration—A Note of Thanks

We at Student Evaluation wish to express our appreciation to you, the principals and teachers throughout Alberta, for the care and attention you gave to the administration of the 1995 achievement tests. Successful implementation of the expanded program and the changes in procedures and rules depended on your assistance and cooperation. We hope that you find the changes in the testing and the additional achievement information helpful in your work with students.

For further information, contact Greg Thomas, Assessment Specialist or Dennis Belyk, Assistant Director, at 403-427-0010. The toll-free number is 310-0000.

